

An Evaluation of Wound Healing Activity of *Meshashrungi Phala* (*Gymnema Sylvestre* R.Br.) with Special Reference to Excised Wound on Wistar Albino Rats

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ABSTRACT

Wounds are physical injuries that results in an opening or break of the skin that cause disturbance in the normal skin anatomy and function. Wound healing is an interaction of complex cascade of cellular and biochemical actions leading to the restoration of structural and functional integrity along with regaining of strength of the injured tissue.

It also involves continuous cell to cell interaction and cell matrix interactions that allow the process to proceed in different overlapping phases including inflammation, wound contraction, re-epithelialisation, remodelling etc. Many Ayurvedic plants have important role in the process of wound healing. Among them, *Meshashrungi phala* is indicated in *Vrana*. The present research work was conducted to analyse the wound healing action of the fruits of *Meshashrungi*.

KEYWORDS: *Meshashrungi* (*Gymnema sylvestre* R.Br.); Wound healing activity

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INTRODUCTION

Wound is a disease according to system of Ayurveda while it may be a sign in the modern system. In Ayurveda it is compared to *vrana* with various classifications like *sadhyovrana*, *dustavrana* which can be correlated to fresh cut wounds like excision, incision etc. Wounds are physical injuries that results in an opening or break of the skin that cause disturbance in the normal skin anatomy and function¹.

Wound healing is an interaction of complex cascade of cellular and biochemical actions leading to the restoration of structural and functional integrity along with regaining of strength of the injured tissue. It also involves continuous cell to cell interaction and cell matrix interactions that allow the process to proceed

in different overlapping phases including inflammation, wound contraction, re-epithelialisation, remodelling etc².

The wound heals naturally but the role of a wound healing agent is to prevent infection and fasten the healing process. There is a need to find out plant sources which shows the properties like rapid granulation changes, easy availability and economical feasibility.

Research on wound healing drugs is a developing area in modern biomedical sciences. Scientists who are trying to develop newer drugs from natural resources are looking towards Ayurveda. Several drugs of plant, mineral and animal origin are

described in Ayurveda for their wound healing properties under the term *vranaropaka* and have important role in the process of wound healing. Among them, *Meshashruni phala* is indicated in *vrana*. It has *tikta rasa* and it is also indicated in *kushta*, *meha*, *kasa*, *krimi* and *visha* in *guduchyadi varga* of *Bhavaprakasha nighantu*³. The present study was intended to see the efficacy of aqueous extract of *Meshashruni* fruits in wound healing activity.

AIMS AND OBJECTIVES

Evaluation of wound healing activity of aqueous extract of fruits of *Meshashruni* (*Gymnema sylvestre* R.Br.)

MATERIALS AND METHODS

Fresh fruits of *Meshashruni* were collected from the natural habitat, Bagalkot.

Excision wound model was selected for the study to determine rate wound contraction and epithelialization period. Animals were anaesthetized by using 60 mg/kg single dosage of Ketamine hydrochloride before the animal experiment. The dorsal fur of the animals was shaved with electric clipper and excision wound of size 200 mm² (4 cm²) was created using toothed forceps, surgical blade and pointed scissors. The preparation was applied twice a day from the day of infliction of wound. Until complete epithelialisation, the entire wound was left open. All the 3 groups of animals taken for

Drug dosing schedule

Frequency: two times per day

Total no of days: 21

Healthy Wistar albino rats were divided into three groups of six animals in each group (n = 6) and were kept in separate cages.

Showing grouping of animals

Sl. no.	Group	Drug applied	Dose	Route of Administration
Group 01	Control group	No	-	-
Group 02	Standard group	Povidine iodine	QS	Topical application
Group 03	Test group	Aqueous extract of fruit of <i>Meshashruni</i> (<i>Gymnema sylvestre</i> R.Br.)	QS	Topical application

Evaluation of wound healing activity

Wound healing activity was assessed in animal model by using transparency sheet and permanent marker on day 0, day 3, day 6, day 9, day 12, day 15, day 18, day 21 and wound closure was calculated of Test drug, Standard drug & Control group animals.

Parameters employed for assessing the wound healing activity

1. Wound measurement

Wounds were inspected and photographed and progressive changes in wound area were monitored planimetrically by tracing the wound margin on a transparency sheet every alternate day. The change in healing of wound, i.e. the measurement of wound area on transparency sheet was expressed as unit (cm²). Wound contraction was expressed as reduction of original wound size.

experiment was treated in the similar manner as mentioned above⁴.

Test Drug

Aqueous extract of *Meshashruni* fruits (*Gymnema sylvestre* R.Br.)

Standard Drug

The standard drug used for wound healing activity evaluation is Povidine Iodine.

Animals

The study was carried out in Wistar albino rats of body weight ranging from 200-250 gm. They were obtained from well-established animal house H.S.K College of Pharmacy, Bagalkot, Karnataka. They were maintained on feed of food and tap water was given. The temperature and humidity were kept at optimum, and animals were exposed to natural day night cycles.

Experimental procedures were undertaken according to the principle guidelines of animal care with prior permission from Institutional Animal Ethical Committee.

Drug Preparation: Aqueous extract of fruits of *Meshashruni* (*Gymnema sylvestre* R.Br.) was prepared at H.S.K College of Pharmacy, Bagalkot.

Dose Fixation –Quantity sufficient as per topical route of administration with the help of spatula.

2. Wound closing days and formation of dermis

Falling of scab, leaving no raw wound behind, was taken as the end point of complete epithelialization and the days required for this were taken as period of epithelialization.

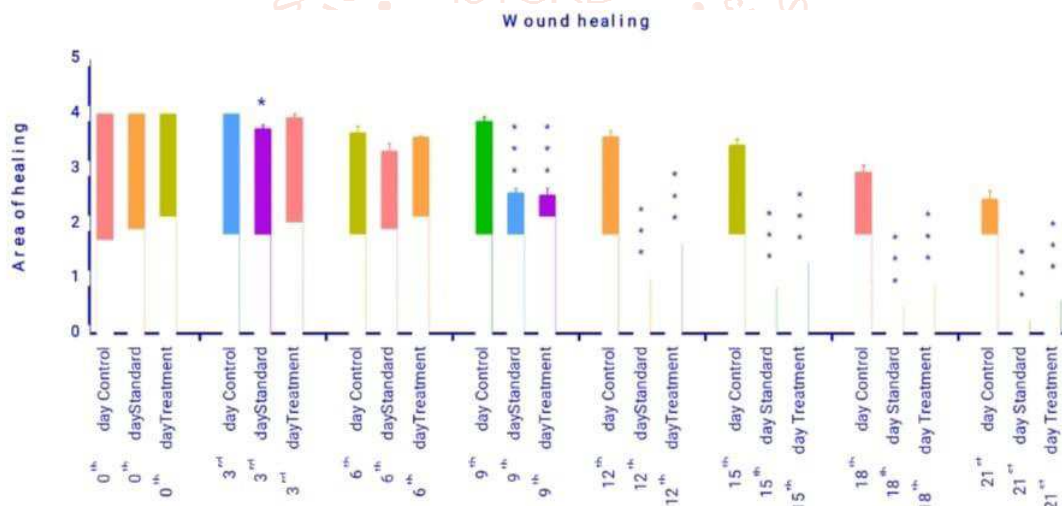
OBSERVATION AND RESULTS

The results obtained were analyzed by one way ANOVA followed by Dunnet's multiple comparison 't' test as post hoc test, by using graphic instant software. A level of $p < 0.05$ was considered as statistically significant. Level of significance was noted and interpreted accordingly. The obtained data in each group are shown accordingly in given tables.

Showing effect of aqueous extract of *Meshashrunji phala* (*Gymnema sylvestre* R.Br.) on wound healing activity on Wistar albino rats

Groups	0 th day	3 rd day	6 th day	9 th day	12 th day	15 th day	18 th day	21 st day
Group1 (Control group)	4.000±0.0	4.000±0.0	3.657±0.12	3.867±0.08	3.583±0.11	3.433±0.10	2.940±0.12	2.447±0.14
Group2 (Povidine Iodine)	4.000±0.0	3.733±0.08*	3.323±0.14	2.565±0.08***	0.9967±0.14***	0.8217±0.26***	0.5050±0.11***	0.2200±0.07***
Group 3 (Aqueous extract of fruit of Meshashrunji)	4.000±0.0	3.933±0.06	3.578±0.01	2.523±0.13***	1.633±0.15***	1.288±0.12***	0.8867±0.15***	0.6000±0.13***

All the values are expressed as Mean ± SEM, n =6, One way Analysis of Variance (ANOVA) followed by multiple comparison dunnet's test. ** $p < 0.01$, *** $p < 0.001$ as compared to the control group.



DISCUSSION

Rasa of *Meshashrunji* fruit is tikta and it is known that tikta rasatmaka dravyas are rich in alkaloids and saponin glycosides which helps in wound healing process. Animal experimental study was conducted to evaluate wound healing activity in which the animals were divided into 3 different groups each group containing 6 Wistar albino rats. Animals were anaesthetized and a predetermined area of 200mm² was excised in the dorsal inter scapular region. All the groups received laboratory food and diet, standard group was applied with Povidine-iodine and the test group was applied with the aqueous extract of *Meshashrunji* fruits for 21 days. Wounds were inspected and photographed and progressive changes

in wound area were monitored plainmetrically by tracing the wound margin on a transparency sheet and permanent marker on every alternative day that is on day 0, day 3, day 6, day 9, day 12, day 15, day 18, day 21 and area of wound closure was calculated. The area of the wound started to reduce from 3rd day and gradually it decreased on 6th, 9th, 12th, 15th, 18th and 21st day. Study showed that test drug aqueous extract of fruits of *Meshashrunji* is effective and have more significance in wound healing when compared to control group.

Probable mode of action:

➤ *Meshashrunji phala* having *tikta rasa* which helps in removal of debris and pathogens as it is

having ruksha laghu guna, which plays important role in wound healing.

- Saponin glycosides can help with wound healing by promoting vascular regeneration and shortening the healing time. They can also enhance the synthesis of collagen which is important for wound healing.
- Alkaloids increase the amount of collagen and fibroblast that help with elasticity and skin structure and they also help in reducing the inflammation.

CONCLUSION

The aqueous extract of *Meshashruni* fruits shows significant improvement in the wound healing action when compared to control group ($P < 0.001$). Aqueous extract of fruits of *Meshashruni* is effective and has significance in wound healing activity on Wistar albino rats.

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